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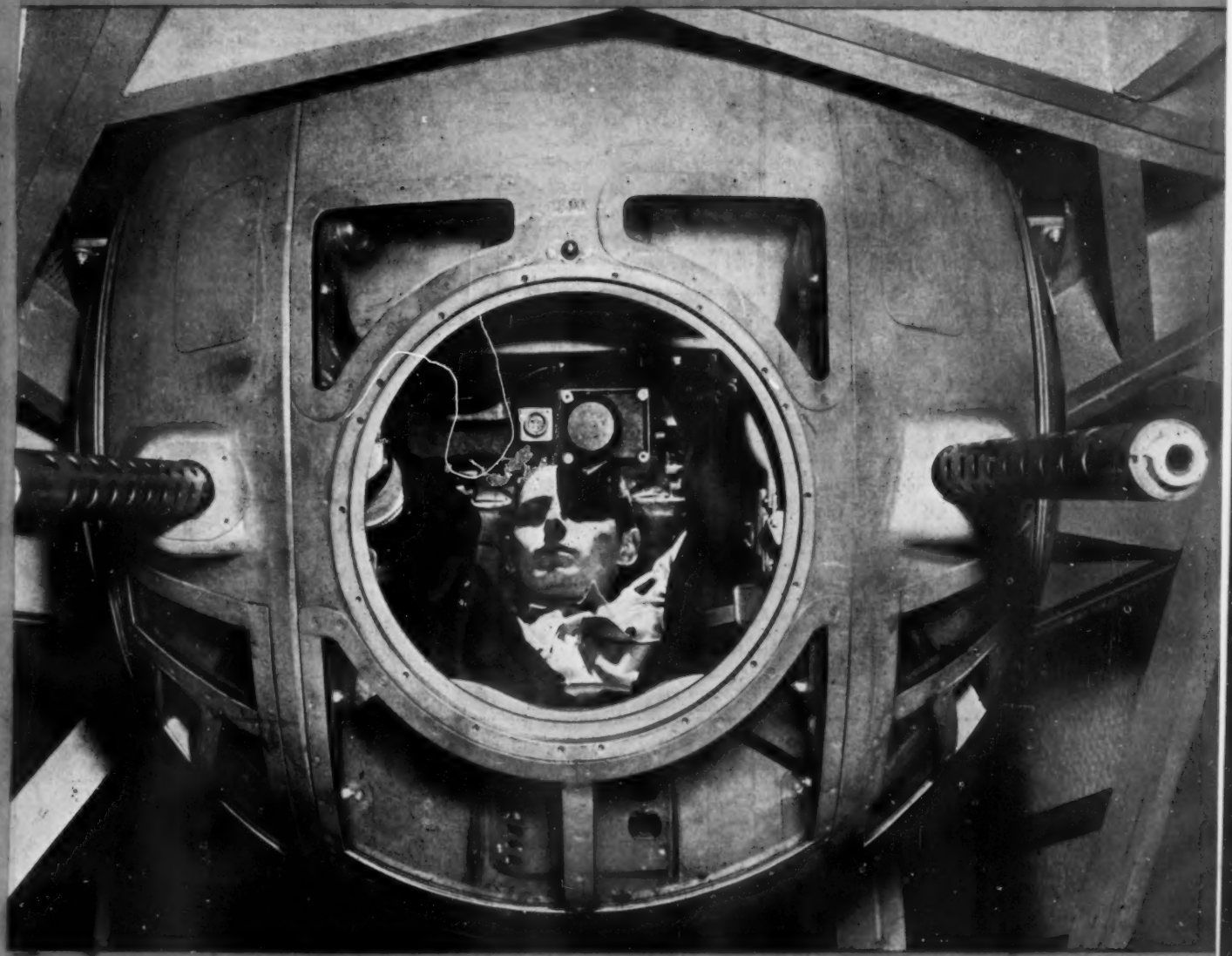
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JULY 10, 1943



Secret Sight

See Page 25

A SCIENCE SERVICE PUBLICATION

Do You Know?

White cement floors that reflect about 40% of the light are used in some aircraft factories to *illuminate* the under sides of planes on which work is in progress.

Citric acid, used extensively in pharmaceuticals, foods and beverages, is now allocated by the government; it is obtained from citrus fruits and the fermentation of molasses.

Silver-lead solder, now used increasingly because of the shortage of tin, contains 2.5% silver, 5% tin and 92.5% lead, while the ordinary tin-lead solder is from 30% to 40% tin, the rest being lead.

Magnetic metals are tested for invisible cracks and flaws by putting them in magnetic fields; the edges of any cracks become magnetic poles causing iron powder sprinkled on the metal to collect at these spots.

The recent establishment of the *Meteorological Institute* at Medellin, Colombia, is a recognition that weather forecasting is now a matter of hemisphere interest because of transportation, agriculture and public health.

Some 325,000,000 gallons of *molasses,* now in storage in Cuba, Puerto Rico and the Dominican Republic, may reach American commercial alcohol manufacturers soon because of a new process of dehydrating and packaging.

Question Box

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NUTRITION

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PUBLIC HEALTH

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What is the condition of the health of America's children? p. 24.

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

When plants now under construction are completed this fall, Texas will be the leading state in the production of *synthetic rubber.*

Cotton fabric production for the first three months of 1943 was over 27,000,000 linear yards more than in the same months last year.

Atabrine is producing results in the Amazon rubber country; in one area malaria, which recently affected 15% of the population, now affects only about 3%.

Swordfish caught off the New England coast average around 300 pounds in weight; one, at least, weighing 1,000 pounds has been landed.

Smoke meters have been developed to measure the density of smoke from internal combustion engines; the density indicates the quality of combustion.

Wild and cultivated *fique,* which resembles the Mexican henequen used in rope-making, is gathered around Cucutilla, Colombia; its fibers are used in making coffee bags.

SCIENCE NEWS LETTER

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CHEMISTRY

Discovery by Accident

A new process for making smokeless powder helps keep peak efficiency in all climates. A new speed record in powder production made possible by discovery.

➤ SMOKELESS POWDER that keeps its peak hitting power indefinitely in any climate is now ready for use by the armed forces. How a laboratory accident led to a new process for making stable nitrocellulose for smokeless powder was announced by Spencer T. Olin, vice president of the Western Cartridge Company.

Hundreds of carefully controlled experiments were made by Dr. Fred Olsen, technical director of the company, and his associates in attempting to purify nitrocellulose. Their aim was to remove the tiny particles of sufuric and nitric acids which remain in wood or cotton fibers after they are treated to produce nitrocellulose in the conventional manner.

One night in the laboratory, after Dr. Olsen had run out of distilled water, he filled a test tube containing nitrocellulose with water from the tap in the sink. To his dismay the water was filled with rust that had scaled off the inside of the pipes in the water heater.

Then he noticed that impure nitrocellulose treated with rusty water produced a more stable explosive than he had ever previously obtained.

Realizing that the rust behaved like a dye and that the instability of nitrocellulose was related to how tightly certain impurities were held by it, Dr. Olsen started a new series of experiments, based on stabilization by means of dyes.

After producing nitrocellulose in every shade of the rainbow, he hit upon a colorless amine compound, called diphenylamine, which worked perfectly.

Although this chemical was always used in the later stages of smokeless powder production, it had never been used to chase the impurities out of the nitrocellulose in the early stages of manufacture.

Discovery of purified nitrocellulose in turn led to a five-fold speed-up in making smokeless ball powder.

Recently a batch of raw cotton was nitrated at nine o'clock in the morning and at three that afternoon cartridges loaded with the stable ball powder were fired on the testing range, an achievement claimed to be the fastest production of smokeless powder in history.

Now in production with the short-cut process, Western Cartridge officials report that more than a billion rounds of pistol, rifle, carbine and machine-gun ammunition for United Nations forces have already been turned out.

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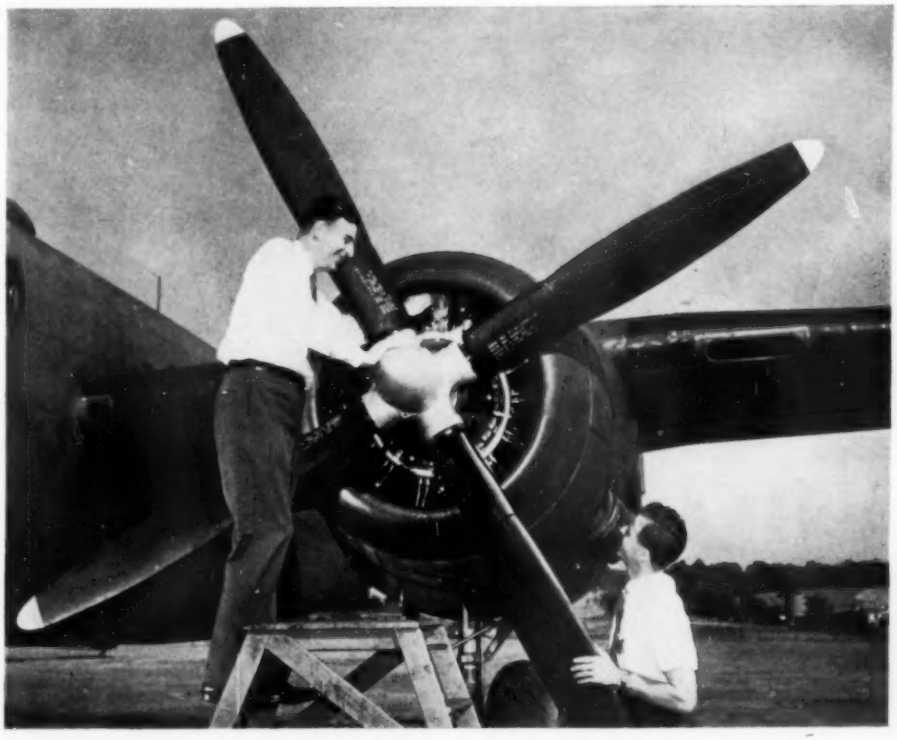

SYNCHRONIZER—A simplified propeller control system, indicated by the Curtiss-Wright chief engineer on the left, enables a bomber pilot, by turning a single knob, to obtain the desired engine speed for maximum efficiency and at the same time automatically to synchronize all the four engines at this speed. Formerly four separate levers had to be manipulated.

PSYCHOLOGY—PHYSIOLOGY

Electrical Test Maps Area Affected by Nerve Injuries

➤ RECOVERY from war wounds and accidents in civilian life involving damage to nerves of arms or legs should be better as a result of a test reported by Dr. Curt P. Richter and Dr. David T. Katz, of Johns Hopkins Hospital (*Journal of the American Medical Association,* July 3).

The test maps the areas of the skin which have a higher electrical resistance than normal. A high electrical resistance over the skin area affected by a nerve shows that that nerve has been cut. If the surgeon performs the test before he starts to repair a wound, he can determine which nerves have been injured and how badly. Without such knowledge, the surgeon may not know that certain nerves have been cut. The wound may heal, but the patient be left with no feeling in part of a hand or foot and, worse still, without the use of fingers or toes.

Besides being "simple, accurate and practical," the test has the advantage of not requiring the patient's cooperation. This is important in case of war wounds and civilian accidents because the patients are usually too shocked to be able to tell accurately where they can feel a pin prick or the touch of a bit of cotton and where they cannot. The pin prick and cotton tests are common methods of trying to determine areas affected by peripheral nerve injuries.

The method of electrical skin resistance mapping is, roughly, to fasten an electrode on the lobe of one ear and

then move another electrode over the skin that might be affected by nerve injury. Meters measure the difference in electrical resistance between the normal and the affected part of the skin.

The test, it is pointed out, should be useful in determining which measures speed up nerve regeneration and which retard it and also in detecting suspected malingering.

Science News Letter, July 10, 1943

AERONAUTICS

Plane Changes Rapid

Airplanes of the future may be four-wheeled crafts with bigger engines housed within the wings, and capable of cruising satisfactorily at well above 20,000 feet.

➤ FOUR-WHEELED planes with bigger, more efficient engines housed within the wings are possible features of future air transports predicted by W. W. Davies, United Air Lines research engineer, in a report to the American Society of Mechanical Engineers.

Continued rapid development of all types of aircraft engines after the war should produce at least a horsepower for every pound of engine weight, due to better design and improved materials. Engines will be much more powerful. Current research projects indicate that specific fuel consumption at normal cruising power may be cut by nearly a fourth. Fuel of higher octane rating is one means of lowering fuel consumption, thereby cutting down the fuel load per trip.

War experience in the higher altitudes will undoubtedly make it possible to cruise satisfactorily at well above 20,000 feet, Mr. Davies declares, and yet keep fuel consumption to a reasonable figure.

Diesel engines may well power a good percentage of future aircraft, but Mr. Davies believes that fuel consumption will not be as amazingly low as enthusiasts have claimed.

Propeller efficiency will be pushed still higher and prop styles may look strange to oldtime fliers. Wide blades, multi-blades, dual or counter-rotating types and probably completely reversible units are some of the possibilities.

Into the discard will go conventional landing gears, generally speaking. In their stead will come increased use of the tricycle gear, main wheels plus a nose wheel, and future developments may well see the use of four wheels, one fore and one aft on each side of the fuselage.

Over-all drag of planes has been cut by a fourth through new developments already seeing service, Mr. Davies discloses.

Auxiliary high-lift devices coupled with improved wing design aid materially in maintaining desirable landing and maneuvering speeds.

"Considerable effort has been expended in research toward the production of new wing designs and airfoils," Mr. Davies stated. "The wing itself is responsible for a major portion of the over-all drag of an airplane."

Reduction in wing area has further lowered the amount of drag. This gives higher wing loadings, often looked at askance because of questionable effects on take-off and landing performance and because of troublesome icing difficulties.

However, larger airports of the future will solve the take-off problem, the engineers are told, while complete instrument landing control and better auxiliary high-lift devices will do much to permit increased landing and maneuvering speeds. Use of heat will nullify the icing problem.

For more economical operation of future transports the present bucket-brigade type of loading must be replaced.

"Future equipment must be so designed that, regardless of airplane size, complete loading, transfer, and unloading can be accomplished in five minutes," Mr. Davies maintains.

Movable ramps, conveyor systems and docking facilities are some of the possible solutions.

Further delay is due to trouble-shooting and repair work during airport stops.

"Future equipment will be so designed," says Mr. Davies, "that complete replacement of a malfunctioning assembly or unit can be made during a scheduled stop. This may apply even to the complete power plant."

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The output of *charcoal* in Sweden has trebled in the last couple of years, the by-products of carbonization being more fully recovered than ever before.

CHEMISTRY

Sea Water for Shipwrecked Made Potable by Invention

➤ MANY NATIONS have been striving to develop a simple, compact device for making sea water fit to drink. A welcome wartime invention which seems to meet these requirements has been patented by Dr. Alexander Goetz of Pasadena, Calif.

Neither expert knowledge nor accuracy are needed by war victims adrift on the ocean to use the two small boxes of chemicals recommended by the inventor.

Two salts make ordinary sea water unfit for human consumption: ordinary table salt or sodium chloride, and magnesium chloride. The amount of other salts present is not harmful.

To remove the pair of objectionable salts, Dr. Goetz adds a reagent compound of silver, preferably silver oxide. This reacts with the chloride part of the salts to form an insoluble silver chloride that settles out as a white powder, and the magnesium takes the chemical form of the hydroxide which is also insoluble.

The sodium part of ordinary salt remains in the water as a soluble hydroxide which is not tolerated by the human body. Rather than go through a complicated procedure to remove the sodium, a weak organic acid is added, such as tartaric or citric acid. A non-toxic compound is thus formed, making the water potable in two simple steps.

The chemicals will treat about ten times their weight of water. Exact amounts need not be used. Taste is a good guide to reveal when enough of the weak acid has been added.

A refinement may be added to the method by mixing a bit of chemical indicator with one of the chemicals. A color change shows when the water has been neutralized.

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Usually domestic animals avoid *poisonous plants;* when food becomes scarce they browse on plants they would not ordinarily touch.

● RADIO

Saturday, July 17, 1:30 p.m., EWT

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Gregory J. Comstock, Professor of Powder Metallurgy, Stevens Institute of Technology, will talk about "Scientific Advances of Powder Metallurgy."

MEDICINE

Vitamin B_2 from Yeast

Riboflavin, vitamin important in the prevention of some eye and skin ailments, is produced in large quantities by one species of yeast.

➤ RIBOFLAVIN, otherwise vitamin B_2, important in the prevention of certain eye and skin ailments, is produced in large quantities by one species of yeast, Prof. Paul R. Burkholder of Yale University discloses (*Proceedings of the National Academy of Sciences*). This is one of the scarcer vitamins; although it is present in many vegetables, some meats, egg yolks and milk, its concentration is always so low that providing enough of it in ordinary diets is a constant problem. A new and abundant source therefore becomes a matter of great practical importance, since it may eventually be of use medicinally and in food enrichment.

Prof. Burkholder's strain of yeast was first isolated from sour milk several years ago by a colleague, Dr. Lynferd J. Wickerham. He states that he is not disclosing its exact identity at present "for obvious reasons" — presumably to forestall premature attempts to exploit it commercially.

When the yeast was cultured in a synthetic nutrient fluid containing mineral salts, glucose and an amino acid as source of nitrogen, it produced so much of the vitamin that the liquid was turned yellow. The yeast cells seem to excrete it as fast as they produce it, for when they were separated out by centrifuging they proved to be white, like ordinary yeast cells, while the color remained in the liquid. Biological tests proved it to be very rich in riboflavin. This automatic separation of the vitamin by the producing cells will probably be an important factor in eventual practical uses of the yeast-generated vitamin.

Although the high production of riboflavin seems to be an inherited property of this one kind of yeast, environmental factors have a decided influence on its manufacture. Substitution of other kinds of sugar interfered with its production. Too little oxygen also had a depressing effect, as did likewise too much oxygen. Minute amounts of cyanide speeded up production of riboflavin, but slowed down growth of the yeast.

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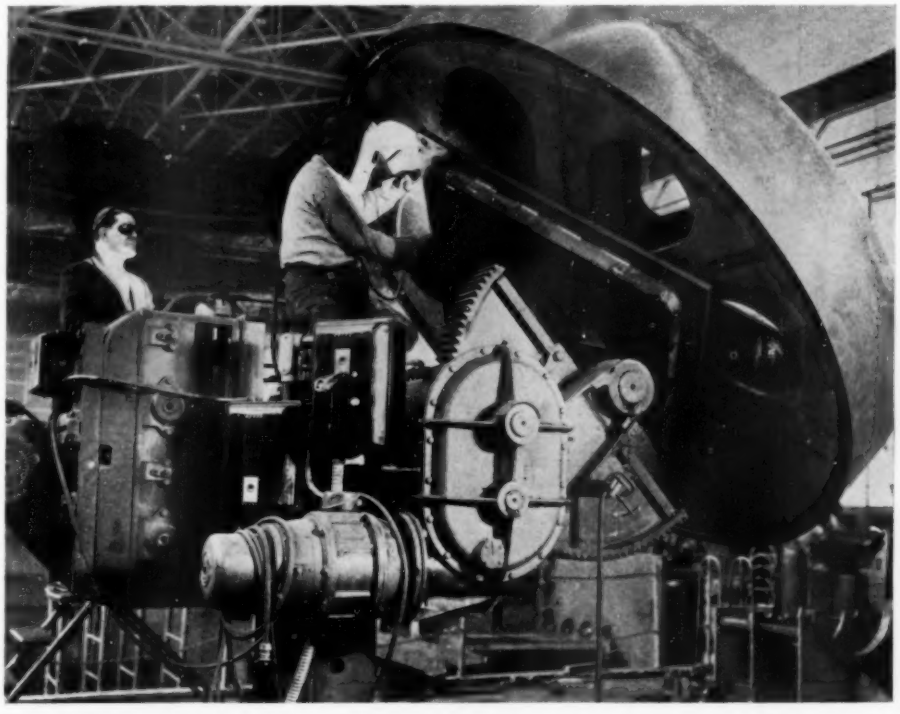

MANIPULATOR—This machine holds "blanks" in any position while welders at a Westinghouse plant join rims to other parts of a giant power-transmission gear. The manipulator produces better welds and cuts many hours from production time; less highly skilled workers are needed for the job.

MEDICINE

Heat Rash Serious Ailment As Well as a Bad Nuisance

➤ MOST of us here in the temperate zone think of prickly heat, or heat rash as it is also called, as an affliction of babies. Grown-ups who occasionally get it in very hot, humid weather look on it as a trivial if irritating nuisance. Even in the tropics, where it is more frequent, it is not generally considered serious.

For soldiers fighting in the tropics, however, it may be quite serious. *The Lancet,* a medical journal published in London, quotes one authority as saying that at Assab, in Eritrea, where intense heat is fortified by high humidity, cases were so severe as to affect materially the efficiency of Army units. Transfer to a cool climate was necessary.

The cause of prickly heat has long been a matter of debate among scientists. The fundamental condition is recognized to be excessive sweating. In one type of prickly heat, affecting the parts of the skin that have small sweat glands, the rash is made up of tiny red bumps. Under the arms and in the groins, where large-coil sweat glands occur, the rash is more like pemphigus and large blisters form. According to the theory quoted by the *Lancet,* in both types the sweat glands get out of order, as it were, as a result of excessive activity, and their ducts are blocked with congestion and retained secretion.

A serious aspect of the condition, in or out of the tropics, is the danger of the skin becoming infected. Boils, ulcers and even fungus infections may result.

Treatment of prickly heat, says the *Lancet,* "is not dramatically successful."

Scrupulous cleanliness, the avoidance of sweating and the wiping away of sweat as it forms are more successful, according to this medical journal, than remedies applied to the skin. Doctors often advise dusting powder, or dabbing with 50% alcohol followed by dusting powder. Obviously, the cloth or towel used to wipe away sweat should be clean.

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PHYSICS

Produce Many Lenses

Makers of linotypes, refrigerators and other massive equipment develop mass production of small lenses for armed forces. Unskilled girls do the work.

➤ MAKERS of linotypes, refrigerators and other massive equipment have now developed mass production of small lenses for the armed forces; unskilled girls with only a couple of days training do the work.

Completed gunsights, periscopes, telescopes and binoculars are tumbling off production lines like so many thousands of match sticks.

Specifications call for accuracy measured in hundred-thousandths of an inch. These instruments match the quality of those turned out by famous German lens makers—and in a fraction of the time.

Now, instead of a highly skilled workman making and assembling each instrument, the job is broken down into a host of small simple operations, each one quickly taught to an unskilled worker. Combining such workers into a mass production line, a gunsight lens is produced from start to finish in a day.

Gunsights must be assembled in air-conditioned rooms where workers wear lint-proof smocks and never touch a completed lens with anything but chemically cleaned forceps. For a speck of dust lying on the reticle, or sighting piece, would look as big as a boulder to anyone peering into the gunsight.

At the Minneapolis-Honeywell Regulator Company, which is doing such work along with companies like Nash-Kelvinator and Mergenthaler Linotype, they had a lot of trouble cleaning glass on rainy days.

Glass absorbs or releases moisture, depending on the humidity. On days when humidity was falling, moisture inside the glass came out and deposited small particles of salts on the lens surface. This made it almost impossible to clean the glass to the perfection required.

Company engineers solved the problem by developing a humidity system that keeps the moisture content of cleaning rooms the same at all times.

An improved method of photographically etching cross lines and intricate firing patterns on sighting reticles has also been developed. Unskilled employees turn out the most complicated reticles in half the time formerly required. They replace skilled workmen who cut the designs by hand on pantograph machines.

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***MASS PRODUCTION**—Optical pressings are inspected for thickness to make sure that enough extra glass is available so that the lens can be ground and polished to proper dimensions.*

NUTRITION

Mold Developed on Food Is Not Always Dangerous

➤ WHEN SUMMER weather is wet as well as warm, many housewives have more than usual trouble with mold on bread or other foods. This year we cannot afford to waste any food, so it is especially important to keep mold from spoiling it. A chemical treatment for bread dough that is said to prevent mold growth has recently been developed, but unless you know that your bread has been so treated, you will want to try yourself to prevent its getting moldy.

The most important thing for fighting mold is to keep the bread dry. Many housewives in the summer keep the bread in the refrigerator where the low temperature, and the dryness in some mechanical refrigerators, stop the growth of the mold. Since most people do not like dry bread, however, it is generally kept in a closed box which, being damp and dark, favors the growth of mold. The bread box should therefore be scalded, sunned and aired frequently. Once a week is not too often.

Mold itself is not necessarily unwholesome. If you are fond of the more highly flavored cheeses, you know that some of them, Roquefort, for example, owe their delicious flavor to molds. Food that has begun to mold can be eaten without danger if the molding has not extended too far and not too much of it is eaten. If there is only a little mold on a loaf of bread that did not show any at the previous meal a few hours ago, probably the bread can be eaten. A little mold on top of a jar of jelly can be lifted off and the rest of the jelly can be boiled to stop further mold growth and then safely eaten. Jelly that has fermented from yeasts that got into it can be eaten, but you may not like the sharp taste.

The real danger of mold on food is that after a while the mold growth produces decomposition, putrefaction and decay of the food, which does make it unfit to eat.

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CARTOGRAPHY

Army Makes War Maps

Combat fliers are photographing such areas as African desert and Alaskan wilds by a new speedier method. Over 5,000 square miles are covered daily.

➤ ARMY flying photographers have been taking pictures of more than 5,000 square miles of the world's surface per day during the past 10 months. These pictures are worked up into maps by the U. S. Geological Survey to increase efficiency of the nation's air forces over great stretches of African desert, Asian wastes, South American jungle and Alaskan wilds. Many of the areas had been inadequately mapped or not mapped at all.

William Embry Wrather, Director of the U. S. Geological Survey, in a report to Secretary of the Interior Harold L. Ickes, revealed that this accomplishment was possible through use of a new and speedy photographic method called Tri-Metrogon mapping.

Three cameras are set up in a plane so that they snap a set of simultaneous exposures covering an area from horizon to horizon. Flying down a planned course, it is possible for an Army plane to photograph 20,000 square miles in three hours.

Once the pictures are made, they are rushed to Washington for translation into navigation maps for the air and ground forces.

More than 1,600,000 square miles of the world's surface has been photographed to date. This surveyed surface equals the combined prewar area of the United Kingdom, France, Belgium, Germany, Czechoslovakia, Hungary, Italy, Poland, Norway, Rumania, Spain, Sweden and Yugoslavia.

Actual mapping was done by a staff of 250 in the Geological Survey. Under the old field methods of mapping, a staff of the same size would have labored for ten years to cover—although in more detail—the same area.

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MILITARY SCIENCE

Study Enemy Weapons

Army experts examining captured weapons for secrets and weak points find no mystery weapons and none superior to American ordnance.

➤ ARMY EXPERTS studying captured enemy weapons have found neither mystery weapons nor ordnance superior to the American standard. But every day brings evidence that the Germans are constantly improving the design and manufacture of their weapons.

Italian weapons, in contrast, are copies of World War I models or of more recent German and French designs. The Breda machine gun is a notable exception. Much of their materiel is actually of World War I vintage; various arms are obtained from Austrians, French, Germans and Czechs.

Japs are the best imitators, copying designs from armament firms throughout the world. These copies tend to be lighter and of inferior fire-power compared with the originals.

Col. Scott B. Ritchie, chief of the Service Branch in the Ordnance Department's Technical Division, (*Army Ordnance*, June 30) comments that the less powerful weapons of the Japs are doubtless designed that way intentionally to give the smaller Jap soldier less weight to carry. In amphibious and jungle operations, the poor visibility and close quarters combat tend to neutralize the advantages of more powerful weapons.

Enemy equipment is collected in battle areas by special units of the Ordnance Department. It is examined on the spot and then some of it shipped to the United States for exhaustive tests and analysis.

"The objective," Col. Ritchie explains, "is to know everything and why about enemy equipment. For example, if the enemy changes the design of a firing pin in a fuse, we not only want to know what change has been made, but also when and why."

So far, 336 German, 102 Italian and 67 Japanese weapons and types of ammunition have been received at the Aberdeen Proving Grounds, Md., where the materiel is cataloged and examined prior to tests by various research organizations.

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MEDICINE

Difference Between Sexes Found for Blood Groups

➤ DISCOVERY of a difference between men and women with respect to blood groups is announced by Dr. R. A. Fisher, of the Galton Laboratory, University of London, and Dr. J. A. Fraser Roberts, of Stoke Park Colony, Bristol (*Nature*, June 5).

More women than men belong to Group O, these scientists found, and more men than women belonged to group A. The difference was first noted in Yorkshire, and examination of the records of the British Army Blood Transfusion Service showed the same difference in southwestern England. In a center in the London area, no difference was found but this is believed due to population movements.

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AERONAUTICS

Glass Fibers Coating Wings Improve High-Speed Planes

➤ FURRY plane wings, made by covering the surfaces with fine glass fibers, will be especially valuable for high-speed aircraft, claims their inventor, William Harper, Jr., of Montreal.

"It is, so far as I am aware," he states, "the only type of airfoil surface which will avoid turbulence at speeds above six-tenths of the velocity of sound."

A nap of fine, one-eighth-inch glass fibers reduces skin friction which he believes to be the result of turbulence between the outer layer of airfoil surface and the air beyond.

The invention can be applied to propeller blades as well as all airplane surfaces along which the air flows. Glass filaments on the covered surfaces stand at about a 45-degree angle when the plane is not in flight, but after the take-off are flattened out more nearly in line with the surface, especially on the forward parts.

Making the glass nap durable and unaffected by moisture is a feature of Mr. Harper's invention.

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INVENTION

New Type Punch Press Speeds Up Production

➤ INVENTION of a new type punch-press by an ex-soldier increases speed of Canadian production of brass washers more than twenty times.

The water-tight doors into which these brass washers fit form a vital part of Canada's warships. They spell the difference between a ship's sinking and staying afloat after an enemy shell, mine or torpedo allows water to flood into the sealed-off sections of the vessel.

The inventor, Harold Ker of Vancouver, was hurt so badly two years ago by a German sailor whom he was escorting to an internment camp, that he had to be discharged from the Army. But he is back in the war as a machinist fitter in a West Coast shipyard, building Frigates for the Royal Canadian Navy and inventing gadgets to help hasten victory.

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PUBLIC HEALTH

Women's Safety Shoes Called Tools of Industry

➤ FOUR STANDARDS for women's safety shoes, designed to save valuable war materials and protect women workers against injuries, have just been completed by the American Standards Association. Women's safety shoes, considered primarily as tools of industry, may be obtained by the workers in addition to shoes normally allowed under rationing.

Women workers in war plants, of whom there are now approximately 4,000,000, are surrounded by hazards with which they are totally unfamiliar. Injury to the worker's foot by falling objects is one of the most common causes of accidents resulting in absenteeism. Open toes and flimsy playshoes have no place in war industries, and even the more sturdy shoes now on the market fail to afford adequate protection. Working at the request of the War Production Board and the Office of Price Administration, the American Standards Association has approved four types of safety shoes. The type designed to be most generally used is a work shoe with a steel toebox. Shoes of this type, which furnish adequate protection from falling objects, have not been manufactured for women heretofore.

High safety-toe shoes afford ankle-high coverage for use of women filling such jobs as that of welder. Women's non-sparking shoes are designed to protect the wearer and the plant from hazards due to explosions set off by sparks. Women's conductive shoes minimize hazards to workers and property from electricity accumulated in the bodies of workers. Different colored tongues will be used to help differentiate the various types of safety shoes.

Science News Letter, July 10, 1943

ENGINEERING

Future Houses Insulated With Snow-Like Plastic

➤ VISITORS at the Goodyear Research Laboratory were shown through a "synthetic house" which may help solve the post-war housing problem. It is entirely prefabricated, with walls consisting of plywood bonded to very light-gauge metal, with the less than three-inch space between the inner and outer layers filled with a new, extremely lightweight plastic foam that looks like dry-ice or packed snow and has even better insulating properties than the snow blocks used by Eskimos in building their houses.

Science News Letter, July 10, 1943

NUTRITION

Army Tells Grounded Fliers How to Get Along In Arctic

➤ DON'T eat polar bear liver; it's poisonous. But seal kidney is good meat, and so is seal heart. They're not in the meat-ration list, either—all you have to do is first catch your seal.

These are among the food suggestions in a new Army Air Forces book, titled *Arctic Emergencies,* intended for the use of aviators who have to bail out or make forced landings on the far northern tundra. There is enough to eat in the summer Arctic, if you know how to go about it: cranberries, for example; and if there aren't any turkeys you can sometimes catch a goose. There are lots of mushrooms, all edible except one species and that one is easily identifiable by its bright red cap.

The book also tells how to get maximum warmth from your flying suit, how to make goggles to prevent snow-blindness, and gives other useful camping-out hints for high latitudes.

Like its recently published companion volume for use in tropical jungles and deserts, this book is printed on water-resistant paper and has a water-proof cover.

Science News Letter, July 10, 1943

IN SCIEN

CHEMISTRY

Heat Causes Deterioration Of Fabrics Put in Attic

➤ THE BEST storage place for fabrics is not the traditional attic but a dark storage closet on a lower floor, according to results of a four-year test conducted by textile scientists of the U. S. Department of Agriculture. Most attics become very hot in the summer, and heat has been found to cause deterioration of stored fabrics.

Tests were made of both new and desized cotton sheets and degreased woolen samples stored at 102 degrees Fahrenheit, the average attic temperature, and at room temperature. Changes in these fabrics were not enough to make them unserviceable, but they were found to deteriorate more in hot-storage. The fabrics became weak and tender, and cottons and linens yellowed. Linen stood up better than other fabrics under the Department of Agriculture tests.

Greater chemical deterioration was caused when light reached the stored fabrics, light damaging linen more than high temperature.

Science News Letter, July 10, 1943

PUBLIC HEALTH

American School Children Healthiest in the World

➤ AMERICAN school children are "among the healthiest in the whole world," a report from the Metropolitan Life Insurance Company's statisticians declares.

The current death rate among white children aged 5 to 14 years is just under one per 1,000. This is one-half the rate prevailing only one year ago.

There is still considerable room for improvement, the statisticians point out. The five chief causes of death among children of school age are, in order of numerical importance: accidents, appendicitis, influenza and pneumonia, rheumatic fever and tuberculosis.

Accidents cause more than one-fourth of all deaths of school children in America. These can be prevented and the killing of children by the four diseases can be greatly reduced by further efforts to protect child health.

Science News Letter, July 10, 1943

NCE FIELDS

ENGINEERING

Secret Computing Sight Takes Guess Out of Gunnery

See Front Cover

➤ AUTOMATIC computing sights now take the guess out of aerial gunnery and help make B-17 bombers the deadliest heavyweight fighters of the war.

The secret sight, developed by the Sperry Corporation, makes .50 caliber machine guns effective at ranges up to 1,000 yards, Thomas A. Morgan, president of the company disclosed.

Comparatively little skill and training is required of gunners using the sight. It automatically figures the fall of the bullet because of gravity, the deflection caused by wind, and the amount of "lead" required to hit a moving target.

If a duck hunter aims directly at a flying bird, his target will be out of the line of fire by the time the shot reaches its objective; learning to judge the proper "lead" takes long experience. Aerial gunners shooting from a fast moving plane at a fast moving target have an even more involved problem to face.

Using the computing sight, however, the gunner seems to aim directly at the target. The sight points the guns automatically and continually at the spot where the target will be by the time the bullets arrive. No mental calculations need be made.

The sight is an integral part of Sperry designed ball turrets which make possible the mounting of more than one gun per sight. A hydraulic "muscle" moves the turret, guns, sight, and gunner as a unit, turning as slowly or fast as the operator wishes.

Science News Letter, July 10, 1943

ASTRONOMY

Old Nova of Northern Crown Develops Stationary Shell

➤ THE OLD NOVA of T. Coronae Borealis, one of the stars in the constellation of the northern crown now high in the evening sky, is believed to have developed a stationary shell. This phenomenon is occasionally observed in early type stars, reports Dr. Rudolph Minkowski of Mount Wilson Observatory, but this is the first time on record than an old nova has shown such a development.

T. Coronae Borealis is believed to be a binary system composed of a normal M-type giant and a blue variable star, the old nova. The hotter component of this star, probably the old nova of 1866, is credited by Dr. Minkowski (*Publications of the Astronomical Society of the Pacific*, April), with not only having become brighter, but also having developed a stationary shell.

The actions of many stars can best be determined by a study of the star's spectrum. A comparison of the spectrum of Nova T. Coronae Borealis made in February, 1943, with one made in May, 1942, states Dr. Minkowski, shows a profound change in the violet and near-ultraviolet while the two are very similar in the red.

A number of absorption lines, characteristic of light shining through a glowing gas, have recently appeared in the spectrum. The faint presence of one or two absorption lines of helium in the earlier spectrum was probably the first indication that this transformation was taking place.

Science News Letter, July 10, 1943

AERONAUTICS

Anti-Aircraft Guns Latest To Join Flying Procession

➤ ANTI-AIRCRAFT GUNS are the latest additions to the flying procession of weapons and vehicles—light tanks, jeeps, anti-tank guns, howitzers—that are carried in long, locust-like leaps from bases to remote battlefields by the Army's growing fleets of transport planes. Capt. John J. Stark, Coast Artillery Corps, describes the weapons in their new role in the *Coast Artillery Journal*. (May-June)

With the guns go their crews and enough ammunition and supplies to set them up in business. More ammunition, food and other necessities follow by later planes.

Arrived at destination, it is only a matter of seconds until the guns are snaked out of the planes and set up, ready for action against enemy aircraft. They are expected to be especially useful in strengthening our forces' hold on captured airfields, supply areas, etc. Because of their high velocity, they can be used with effect against counterattacks by enemy mechanized ground forces as well as planes.

Science News Letter, July 10, 1943

MEDICINE

Plasma Can Greatly Aid Conditions Besides Shock

➤ SHOCK is not the only condition which can be helped by blood plasma, Dr. Max M. Strumia, of Byrn Mawr, Pa., told the American Society of Clinical Pathologists meeting in Chicago.

Dr. Strumia was selected by the society's general research committee for the 1943 Ward Burdick Award.

Plasma, he reported, can be of great aid in conditions unrelated to shock in which the body is holding water far in excess of the normal amount without visible dropsy. Patients in this condition, among whom may be many who have had operations on the stomach and digestive tract, are also generally in a state of protein depletion. The digestive tract itself may become dropsical, interfering with digestion and absorption of proteins.

Plasma, Dr. Strumia believes, may aid recovery in these patients.

Science News Letter, July 10, 1943

MEDICINE

Attack on Malaria to Take A New Line in the Future

➤ A NEW LINE of attack on malaria was predicted by Dr. W. McDowell Hammon, of the University of California Medical School, at the meeting of the Northern California Public Health Association.

The new attack will probably aim at stopping the disease during the six days between the bite of the infected mosquito and the appearance of the malaria trophozoites in the red blood cells. This six-day period represents a stage in the cycle of malaria germs which scientists have only recently studied.

Treatment heretofore has been aimed at the germs after they are seen in the blood stream. Studies of malaria in birds, however, show that the malaria germs develop in the reticulo-endothelial cells of the spleen, bone marrow and capillaries of the brain before they enter the blood cells.

Although future research will probabily be directed toward stopping the infection at this early stage, Dr. Hammon declared that "at present we must depend on mosquito repellants and larvae control. We must not relax our vigilance or our mosquito abatement budgets."

Science News Letter, July 10, 1943

GENERAL SCIENCE

Post-War Promises

Discoveries which today are aiding the Allies will make our lives more enjoyable after the war, but their application may be slow.

By WATSON DAVIS

➤ THE TRANSITION from a war world to a post-war world will be gradual with many jolts. We will not all be able to buy that new automobile or television set in the year of Jubilo.

We will not be able to burn our ration stamps. We will not all rush down to the airport and reach the ends of the earth in 60 hours for well-earned vacations. But there are things that we can see coming if we look in the right places.

A chemical has been developed, that provides a sort of invisible raincoat for anything that is dipped into it. Yet the highest power microscope can not reveal a tangible film upon the substances so treated. A treated piece of paper dipped into water is unaffected and drops roll off it more effectively than off a duck's back.

So keep your eyes on the silicones and the methyl chlor silanes, as these most promising organic silicon compounds are known. Imagine how useful they will be in the post-war era when they come back from the wars.

There are other materials that are extremely plentiful that we may be using more widely. A sort of clay, bentonite, for instance, is a promising raw material from which artificial mica has been made. We can make aluminum from clay if we have to.

Houses Made of Glass

Sand is one of the oldest of raw materials. It is used in making glass. Glass is today something more than glazing for windows. Whole houses can be made from blocks of it. Germans are said to be wearing glass clothes now and all of us may be wearing glass fiber textiles in a post-war world.

Glass fiber is an important war material, appearing in camouflage nets and insulation alike. It ranks with optical glass as a critical material. It is not too far fetched to suggest that clay and sand in these forms may be packaging materials of the future.

New plastics are going to give more competition to the old-line textile fibers, such as cotton, wool, linen, and silk if the Japs are ever allowed to produce it again. But it is not at all impossible that we shall be clothed in the future with a sort of cloth that needs no weaving.

Textile fibers, synthetic or natural, can be made into a cloth-like sheet by the use of paper-making technique modified so that plastics mingled with them form a lattice which gives the material some of the characteristics of woven cloth.

The trick is that the thermoplastic fibers weld together the others. This is no future dream for a material of this sort has replaced the old-fashioned cloth teabag. We may even come to the day when we can have new fresh clothes whenever we wish to change such synthetic "linen" or send a suit to be reclaimed.

Present laundries might give way to clothing factories that have speedy production lines for stamping out by the millions such expendable outfits. They then might be said to be in the business of packaging human beings in a variety of styles and sizes.

There are at least a dozen rubbers—elastomers, the chemist calls them—in production from oil, coal or vegetable substances from down on the factory-farm. Our chemical rubber production has had to be accelerated at such a tremendous rate to catch up with the fast one that the Japs pulled that we don't know quite yet just what it means in the years to come.

It is very unsafe to tell the chemist you need a substitute for a natural product and give him a chance to produce it because he is usually able to produce something that is better, and in the long run cheaper, than what has been used. Certainly all of the synthetic or artificial rubbers are here to stay for special uses and it is not impossible that some of them will be so much better for tires that they will be used even when the tree-grown sort is again available.

Lignin, partner to cellulose in wood, has been much neglected and can be expected to be more usefully employed as a raw material for plastics, Casein,

SYNTHETIC RUBBER—Another product of the chemist which will be tailor-made to give superior products. This shows newly rolled sheets of synthetic rubber being cut to size for the drying pans.

"PERISCOPE ON THE STARBOARD QUARTER!"

IN SUBMARINE-infested waters, a speeding destroyer must be able to change its course in a split-second—to drop its deadly ashcans on enemy U-boats.

The secret of the destroyer's great *speed* and *maneuverability* is the tremendous power of its turbines, operating at steam temperatures *high enough to make the turbine blades glow!*

This introduces a difficult problem in turbine construction. The highly heated metal parts "creep" under stress. The metallic grains slowly slide over each other. The metal tends to *flow* out of shape.

Excessive "creep" would quickly destroy the turbine—due to collision between the blades and other parts of the turbine, which are spaced only a *fraction of an inch apart* for maximum power.

Westinghouse first introduced the steam turbine in the United States and has built thousands during the past 45 years. And much of the success of Westinghouse steam turbines is due to the intensive study of "creep" by scientists in the Westinghouse Research Laboratories.

As a result of the "know how" gained through this research, the "creep" in some turbine metals has been reduced to 1/10,000th of an inch per inch per year—less than 1/64th inch per inch in 100 years.

This has guided the development of metals capable of operating at greatly increased temperatures and speeds—and secured *more power per pound of turbine*, a vital necessity in a destroyer!

Westinghouse Electric & Manufacturing Co., Pittsburgh, Penn.

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

whether from milk, soybeans or some other product, can give wool a run for its money and double for many plastics.

When nitrogen was snatched from the air for explosives and fertilizer (and that was one thing that gave the Germans the jump chemically in World War I) we mined the air. In this war we are mining the ocean for the light metal magnesium just as we earlier mined the briny deep for bromine used to make anti-knock fluid for the improvement of gasoline. So we have utilized almost all natural sources of the earth in one way or another.

Even the atom may be mined for power and we only hope that our side does it first. This is a great and important research problem that we haven't had reports from since shortly after the fall of France in 1940 when our scientists were given a stock of shiny new rubber stamps that print SECRET. You will remember that through atomic bombardment the uranium atom U235 can be split asunder with the release of more energy than is put into it.

If this or some other such process is made practical and controllable, it may make coal mines, oil wells, water falls, and other sources of power obsolete and worthless. This probably wouldn't happen in a hurry and the transition would probably be gradual because of the natural cussedness of development difficulties if not by government regulation.

Even without the miracle of cheap power from the atom, there will be amazing production of power in the future. We are now producing in a couple of months as much mobile horsepower in aviation and auto engines as is installed in America's central stations and that's millions of mechanical horses.

The Diesel engine, lusty as it is, is still youthful and full of greater promise. We have not yet explored all the real possibilities and practicalities of tapping the power of the wind or the heat of the earth's interior. Transmission of power over short distances via ultrafrequencies has been hinted at.

We have heard much about 100 octane gasoline but for the future we shall probably hear about 150 octane, which means smaller and more powerful engines, running farther per gallon and per dollar. After the gasoline is made from petroleum there will be still enough liquid gold from the earth to use it, as it is being used, as a chemical raw material of great fruitfulness.

The appearance of that postwar auto that you would order if the dealers would let you may not be what the advertising departments dream it will be. It will be different from the 1942 model and it may not even look like that jeep every small boy wants to drive. There is one good bet. There won't be so much excess weight to cut down gas mileage.

Helicopters for All

The automobile may take second place in the wishing-to-have contest to the helicopter that can hover, take off backwards and land on the front lawn. Come July in the years to come and human fancy will probably turn to that helicopter hop to the place in the country and a week-end cruise two or three times via world airlines to Casablanca or the Fijis.

Talking around the earth is now a daily household sound and we shall, after the war, be able to see at a distance. Television is on the horizon, if not over it. It is all a question of what we want. We must decide whether or not we have our eyes as well as our ears projected into space and thus invade the privacy with which distance has hitherto shrouded distant places and people. It is technically possible to have television in color and with realistic perceptual depth.

We who use it will probably decide one way or the other whether we want to bring into our homes and offices something that we have to look at with our eyes as well as listen to with our ears.

Radar detects planes and ships scores of miles away by reflections of ultra-high frequency radio waves. It is an industry larger than the making of broadcast sets in pre-war years.

Application for Radar

There will be important peacetime applications of such electronic devices where our airplanes fly blindly through fog and night with safety. There will be applications of such devices on vessels at sea when it is safe to go to sea again. It is a little hard to see how we can use such devices in our kitchen or living room when they are removed from the secret military list. You may be sure, however, that the vast experience being developed in the use of high frequency radio waves will bring us many services which it is now hard to visualize.

Facsimile radio for homes and offices may very well provide a continuous ticker service. Personal radio will be used more like a telephone without wires but most of us won't wish to carry around with us a walkie-talkie in order not to miss a telephone call that we don't want to receive.

Despite the frightful human slaughter that war causes, especially the kind of war of extermination practiced by the Nazis, those of us safe here are amazingly healthy. Sulfa drugs, germ fighters from soil bacteria, and even cures and preventives of such diseases as cancer, and tuberculosis may cause us to live longer if not more merrily.

We shall be able to stay fit longer and retire later in life. We may hope for better understanding of the foibles and mental quirks of our temperaments.

Microfilms, popularized by V-mail, may carry a major burden of the world's speedy intelligence between far places, while the miniature photographic images will preserve and condense the astounding volume of the written record of our complex civilization, probably much more of it than should be preserved.

Science News Letter, July 10, 1943

Over 60% of the American *corn* crop is now used to make starch, sugar, syrup, alcohol and alcoholic beverages.

Since the purchase of Alaska from the Russians, through 1942, the value of the fishery products, exclusive of aquatic furs, has amounted to approximately $1,500,000,000.

BULLETINS AVAILABLE

To supply information frequently requested, Science News Letter has issued concise, authoritative bulletins on:

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Garden Seeds	Poison Ivy*
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Human Mind	Population
Hydroponics	Pressure Cooker

Vitamins

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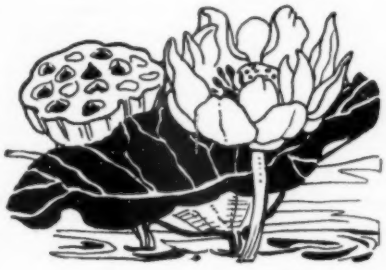
BOTANY

NATURE RAMBLINGS

by Frank Thone



"A Table Before Me"

▸ FINDING FOOD enough in the jungle should become less of a problem for our fighters in the Pacific theater of war: introductions to a large variety of edible plants have now been arranged by one of the world's leading botanists, Dr. E. D. Merrill of Harvard University, through a new technical manual of the War Department, entitled *Emergency and Poisonous Plants of the Islands of the Pacific* (Supt. of Publ. Documents, 15c).

The handbook is small (pocket-size, and only 149 pages) but it is complete, thorough and practical; written moreover with an eye to its use by men who may never have paid any attention to plants before an urgent stomach tells them to hurry up now and learn some botany. A large proportion of the species described are also pictured; there are 113 simple but adequate pen-and-ink drawings. Names are given first in English, then the botanist's Latin for positive identification, then native names in anywhere up to 20 or 30 local dialects, just in case you have a chance to ask a brown neighbor any questions.

Divisions are along strictly practical lines: plants with edible leaves and stems, with fleshy tubers or roots, with good fruits, with edible seeds. Some are not native to the jungle, but may be found where gardens once have been, or "gone native." The latter group include such familiar American species as peanuts, lima beans and small wild tomatoes. Familiar, too, through its close resemblance to our American species is the oriental lotus: we may have actual lotus-eaters among us presently.

There is a short special section of plants used to stupefy fish, which includes the derris which has become a standard source of insect sprays. Another brief section is devoted to ferns, all of which are given a clean bill of health so far as danger from poison is concerned. The tree ferns can yield tasty and nutritious "cabbages"—their terminal buds. Similar "cabbages" can be obtained from many kinds of palms.

The rather numerous tribe of the aroids, identifiable by their "elephant-ear" leaves, some of them very large, include the taros, staple food source for thousands of dark islanders, but reputed to be poisonous to the uninitiated. They are not really poisonous, Dr. Merrill states, but they do contain myriads of sharp-pointed microscopic crystals, which can cause extreme irritation to the lining of the digestive tract. These can be eliminated by thorough cooking, after which the plants become one of the best sources of emergency food.

Unnecessary fears are often entertained about the "poisonous" character of the tropics. Dr. Merrill lists only half-a-dozen plant species as poisonous, among them the familiar castor-bean. He states also that the chances of getting bitten by a venomous serpent in the tropical jungle is rather less than that of being struck by a rattlesnake right here at home in the United States. Insects and other creeping things are really more troublesome—and more dangerous.

Dr. Merrill is in position to speak as one having authority. He was in active botanical work in the Philippines for more than 20 years, with a number of expeditions into other tropical lands. At present, besides being professor of botany at Harvard, he is supervisor of the university's great collection of living trees, the Arnold Arboretum.

Science News Letter, July 10, 1943

A *pipeline* from Sundown, Texas, to Drumright, Okla., recently authorized, will be 16 inches in diameter and have a capacity of 54,000 barrels of crude oil daily.

Nearly 194,000,000 ounces of *silver* were used in the United States in 1942, an increase of 43% over the amount used in 1941; one-half is used directly or indirectly for war purposes.

Tungsten is being mined in large quantities in the California Sierras 11,400 feet above sea level; molybdenum, copper, silver and a small amount of gold are obtained from the same mines.

PSYCHOLOGY FOR THE FIGHTING MAN

This new Infantry Journal book tells in an easily understood fashion—

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—how to hear through battle noise—how to read rapidly
—how to camouflage sounds—how not to get airsick or seasick
—how to take care of tired eyes—how to push down enemy morale
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AGRICULTURE

Synthetic Insecticides

To supplement war-scarce insect poisons formerly obtained from Japan or Jap-controlled countries, new insecticides have been developed.

➤ WHEN the Japanese war cut off imports of vegetable insect-control poisons from the Far East, America was not caught wholly unprepared. Government, state, university and industrial laboratories had been searching for synthetic and other substitutes for two decades, and had achieved at least partial success.

Prior to 1940 some dozen synthetic organic insecticides were made and tried. The cheap insecticide materials imported from Japan and other places delayed any of them from becoming widely used. The war situation now has changed the picture; substitutes must be used if the farms and Victory Gardens are to produce enough food to supply our needs.

Among the synthetic organic insecticides are those made from the organic thiocyanates, which are organic salts of cyanic acid. The insecticidal value of the vapors of these volatile thiocyanates was first discovered in the U. S. Department of Agriculture about 20 years ago. Later one of the commercial chemical companies devoted serious intensive study to the thiocyanates and developed a number of effective insect-control materials known commercially as Lethanes. During the past five or six years they have been tested thoroughly by state agricultural colleges.

These Lethane products are now reported to be the major ingredients in the household, livestock and industrial sprays used in this country. The Lethanes are used in agriculture in a mixture with a small amount of rotenone, the principal ingredient of the insecticide dusts used in the past. The supply of rotenone is not entirely cut off, as some is obtained from the American tropics.

Tests show that on insects for which rotenone dusts containing from 0.75% to 1% rotenone had been used in the past, dusts containing 2% Lethane and 0.4% rotenone were equally effective. With more Lethane, even less rotenone may be effectively used.

The same synthetic organic product combined with pyrethrum, another well-known imported insecticide ingredient, has been found effective in controlling such life as loopers on cabbages and leafhoppers on beans and many other vegetables. In the dusts, the Lethanes with rotenone or pyrethrum are mixed with a neutral inert filler such as clay or talc.

Science News Letter, July 10, 1943

MEDICINE

Vitamin A Not a Real Aid In Correcting Color Vision

➤ VITAMIN A failed to produce any significant improvement in the color vision of 58 R.O.T.C. cadets in experiments conducted in Baton Rouge, La., by Dr. J. H. Elder of Louisiana State University. The cadets had various degrees of weakness in color vision.

The vitamin A was given the cadets in capsules which they were required to swallow at a dispensing station so that there could be no possible doubt that they took the vitamin at the prescribed intervals and in the specified doses, which were 25,000 international units daily for eight weeks.

"It seems improbable," Dr. Elder commented in reporting his results (*Science*, June 18), "that administration of the vitamin for longer periods of time would change this result, although observations are being continued on several subjects."

This study, Dr. Elder explained, does not entirely dispose of the possibility that a few men, perhaps with minor color vision defects, may improve slightly, but the number who could use vitamin A for this purpose is so small as to be negligible.

In a preliminary study by Dr. Elder of 16 students with defective color vision, who had been unable to pass tests of the Army Air Corps and who were quite anxious to do so, two were able after taking vitamin A to pass the tests. These two were men with very slight defects.

Science News Letter, July 10, 1943

PHARMACY

B_1 Improves Color Vision; Vitamin A Role Confirmed

➤ VITAMIN B_1 improves color vision more than twenty per cent in men rejected by the armed forces for color blindness, research at the Philadelphia College of Pharmacy and Science indicated.

The experiments reported by Drs. Donald P. LeGalley and J. W. E. Harrisson *(American Journal of Pharmacy, March)* also confirm a report by other scientists that vitamin A produces a like improvement.

Still another vitamin, B_2 or riboflavin, was tried on the color blind men but it failed completely, producing a negligible improvement of less than three per cent.

The experiments are evidently the first indication that vitamin B_1 (thiamin) can

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improve color vision. Although only a small group of four men received the B_1 treatment, the scientists believe that since results within a group check one another, the average result is fairly reliable. Doses of about eight times the normal minimum daily need were given. Before treatment the color blind subjects were presumed to be on an average diet.

With both vitamin B_1 and A, nearly all the improvement possible occurred during the first 10 weeks of treatment. After improvement had levelled off, the experimenters switched the dosages so that the vitamin B_1 group was getting vitamin A and vice versa. This change improved color vision in both groups by more than an additional ten per cent.

A control group was given no vitamins as a check to see whether improvement was due to the subjects "learning" the charts used for testing. Various checks showed that memory could be ruled out as a factor in the results.

Science News Letter, July 10, 1943

MEDICINE

Childbirth Made Safer

A simple test which adds to the safety of continuous caudal anesthesia, the new method of painless childbirth, has been developed.

➤ A SIMPLE TEST which adds to the safety of continuous caudal anesthesia, the new method of painless childbirth, is announced by Dr. Nathan Block and Dr. Morris Rotstein, of Sinai Hospital, Baltimore (*Journal of the American Medical Association*, June 26).

In this new childbirth anesthesia method, developed by Dr. W. B. Edwards and Dr. R. A. Hingson, of the U. S. Public Health Service, a pain-killing chemical is dropped into the caudal canal near the base of the spine. This produces a local anesthetic effect somewhat like that given for pulling a tooth without gas. The anesthesia is limited to the nerves affected in childbearing, leaving the mother conscious and comfortable.

Although some thousand mothers have now had their babies safely with this new style of anesthesia, there is danger of the anesthesia getting into the spinal canal instead of the caudal canal. If this happens, the mother may die.

The danger can be avoided, the Baltimore doctors find, by injecting a salt solution before the anesthetic and determining the rate at which the salt solution flows into the body. If it flows faster than 150 drops per minute after three minutes, the needle has probably been injected into the spinal canal.

Contrary to their expectations, they found from tests under identical conditions that the salt solution will flow into the spinal canal at a rate almost too fast to count, averaging about 230 drops per minute. In most of the cases they studied, the solution flowed into the caudal space at a rate between 80 and 110 drops per minute.

They report success with the anesthetic method in 100 childbirths and 11 obstetric surgical procedures. The preliminary salt test was done in the last 69 cases.

Science News Letter, July 10, 1943

AERONAUTICS

Flying Kit Completed

Broad belt around the waist of Canadian fliers will provide emergency supplies. Five new types of emergency equipment have just been adopted.

➤ EMERGENCY equipment in a broad belt to be worn around the waist is now being distributed to Canadian fliers. The new personal kit is worn under the flying clothes and adds little bulk, being only an inch thick.

It contains gum of high caloric value, eight bars of chocolate and two packets of special biscuits—enough food for three days; also included are matches, complete fishing kit, signaling mirror, medical kit, smoke generators, plastic whistle, large knife, pocket compass and "heat tablets."

The tablets contain chemicals which will burn strongly enough to light a fire even with damp wood.

This beltful of supplies is only one of five new types of emergency equipment adopted by the Canadian Air Force.

There is also a kit to be carried in the plane, much like the personal belt kit but on a grander scale. It includes such additional items as a hand axe, folding stove, cooking pots and insect repellant.

For airmen who may have to land in a winter wilderness, a winter kit is now in production. Equipment designed for life in the arctic ranges from anti-glare eye shields to a warm sleeping bag.

A small emergency radio, also to be carried in Canadian aircraft, transmits either an automatic SOS or code.

When forced down at sea, the fliers have a kit attached to the rubber dinghy which greatly boosts their chance of survival. Signaling devices include marine distress signals, matches that burn with a greenish glare, yellow skull caps, signal flag and fluorescent sea markers.

Rubber stoppers are provided to plug leaks in case enemy airmen machine-gun the dinghy.

Science News Letter, July 10, 1943

The **WAR** *on* **CANCER**

by Dr. Edward Podolsky

Formerly of Fifth Avenue and Flower Hospital Medical Staffs, now a Captain in the Armed Forces.

Realizing the need for a lucid summation of the latest findings in the battle against Cancer, Dr. Podolsky has brought to date the various methodologies of X-Ray, Cyclotron, Radium, Surgery and Refrigeration. He pays particularly interesting attention to the effect of diet and the most recent progress made along chemical lines in establishing the probable causes of this disease. Although this volume is written in an interesting non-technical style, it justifiably merits the attention of a professional audience because it embraces the salient facts of a continuing war that can only cease when Science presents its own terms of Unconditional Surrender.

We recommend this book with the assurance that its completeness will satisfy those who have long desired an authoritative account of the battle against Cancer brought up to date.

180 Pages Illustrated **$1.75**

REINHOLD PUBLISHING CORP.
330 W. 42nd Street, New York 18, N. Y.

• New Machines and Gadgets •

⚙ *A GARDEN HOE with a broad V-shaped blade, bevelled on the lower side, has received a recent patent. The sharp blade is pulled between the rows of vegetable plants to cut the roots of grass and weeds.*

Science News Letter, July 10, 1943

⚙ *SMALL CELLOPHANE BAGS are used by one aircraft manufacturer to hold heat-treated rivets ready for use instead of dumping them into bins or rivet-racks. The bags, filled automatically, keep the rivets in good condition and save time and money because rivets are seldom taken from a bin without some being dropped on the floor.*

Science News Letter, July 10, 1943

⚙ *AN ELECTRIC STOPWATCH or timer can be started and stopped at will and reset to zero from any reading. An automatic built-in brake assures accurate stopping.*

Science News Letter, July 10, 1943

⚙ *PRINTERS for making blueprints, or black and white prints, are now available which are fast, practical and inexpensive. Prints can be made in half a minute.*

Science News Letter, July 10, 1943

⚙ *CARBON BRUSHES used in airplane generators have had their useful life extended fiftyfold by a new chemical process. It enables American bombers to fly higher and stay there longer. Inventor of the new process is shown adjusting a test device which reveals that carbon brushes now last more than 100 hours at high altitudes.*

Science News Letter, July 10, 1943

⚙ *RAINCOATS with gutters to prevent water from the surface wetting the lower trouser legs have been patented. The gutters are made by turning up the lower edges of the coats and holding them up with special fasteners. The folded cloth forms spouts on the two sides.*

Science News Letter, July 10, 1943

⚙ *TWO-USE GLASS JARS, designed by glass manufacturers for double duty, save material and factory labor. They are jars in which the housewife buys foods in the store which can be used later for home canning. Jars with screw-tops and others that can be sealed in the home are two-use jars.*

Science News Letter, July 10, 1943

⚙ *HEATING LAMPS for therapeutic use are available which are less brilliant, thereby minimizing eyestrain when the lamps are used in the line of vision.*

Science News Letter, July 10, 1943

⚙ *LIGHT PLYWOOD MASTS up to 75 feet high and weighing 250 pounds replace metal tubular masts on ships.*

Science News Letter, July 10, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 164.*

• Just Off the Press •

AERIAL PHOTOGRAPHS AND THEIR APPLICATIONS—H. T. U. Smith—*Appleton-Century,* 372 p., illus., $3.75. A beautifully illustrated book on a subject extremely important in modern warfare. By a geologist in the University of Kansas.

AIR-BORNE INFECTION: Some Observations on its Decline—Dwight O'Hara—*Commonwealth Fund,* 114 p., illus., $1.50.

THE AMERICAN ANNUAL OF PHOTOGRAPHY, 1943—Frank R. Fraprie and Franklin I. Jordan, ed.—*Amer. Photographic Publishing Co.,* Vol. 57, 240 p., illus., $1.50. Contains the Who's Who in Pictorial Photography.

AUSTRALIA—Griffith Taylor—*Dutton,* 455 p., illus., $6; 2d ed. rev.

EDUCATION IN WARTIME AND AFTER — Stanford Univ. School of Education Faculty—*Appleton-Century,* 465 p., $3.

FUNDAMENTALS OF ELECTRICITY: A Preinduction Text—William H. Johnson and Louis V. Newkirk—*Macmillan,* 212 p., illus., $2.

FUNDAMENTALS OF SHOPWORK: A Preinduction Text—William H. Johnson and Louis V. Newkirk—*Macmillan,* 200 p., illus., $2.

GETTING THERE: The Psychomotivatease—Robert M. Yergason—*Author,* 40 p., illus., $1, paper. Humor and natural history.

THE HANDBOOK FOR HOME MECHANICS—Eugene O'Hare—*Garden City Publishing Co.,* 335 p., illus., 69c.

MANUAL OF LABORATORY GLASS-BLOWING — R. H. Wright — *Chemical Publishing Co.,* 90 p., illus., $2.50.

PROTEINS, AMINO ACIDS AND PEPTIDES AS IONS AND DIPOLAR IONS—Edwin J. Cohn and John T. Edsall—*Amer. Chemical Soc.,* 686 p., $13.50. Monograph Series, 90.

PSYCHOLOGY FOR THE FIGHTING MAN: Prepared for the Fighting Man Himself—A Committee of the *National Research Council* with the Collaboration of *Science Service* as a Contribution to the War Effort —*Infantry Journal-Penguin,* 456 p., illus. 25c paper; $1.50, cloth.

TRAIL TO LIGHT: A Biography of Joseph Goldberger—Robert P. Parsons—*Bobbs Merrill,* 353 p., $3.

TWENTIETH CENTURY PHILOSOPHY: Living Schools of Thought—Dagobert D. Runes ed.—*Philosophical Lib.,* 571 p., $5.

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